

A NEW SPECIES OF *SOLIDAGO* (ASTERACEAE: ASTEREAEE) FROM NORTH CENTRAL ALABAMA

Brian R. Keener¹

The University of Alabama
Biodiversity and Systematics
Tuscaloosa, AL 35487-0345 U.S.A.

Robert Kral

Vanderbilt University Herbarium
Botanical Research Institute of Texas
509 Pecan Street
Fort Worth, TX 76102-4060, U.S.A.

ABSTRACT

A new goldenrod, *Solidago arenicola*, has been discovered from Blount County, Alabama. It is hereby described, figured, and contrasted with three other *Solidago* species, *S. plumosa* Small, *S. simplex* Kunth, and *S. erecta* Pursh, all of which have similar morphologies and are from the southeastern U.S.

RESUMEN

Una nueva vara de oro, *Solidago arenicola*, ha sido descubierta en el condado de Blount de Alabama. Aquí se describe, se ilustra y se contrasta con otras tres especies de *Solidago*, *S. plumosa* Small, *S. simplex* Kunth y *S. erecta* Pursh, que son del suroeste de los Estados Unidos y tienen morfologías similares.

The description below is based on several specimens, all from the same locality, which is the only locality from which *S. arenicola* has been collected to date. The collections were made along the Locust Fork River in Blount County, Alabama. The habitat at this location is shady, acidic woods in deep sandy alluvium on the river flood plain. These woods are commonly inundated by swiftly flowing water when the river overflows following heavy rains during the winter and early spring months. The drier summer and fall months aided by the porous sandy alluvium bring about a relatively dry substrate as the river recedes to a very small sluggish flow, well within the main channel.

Solidago arenicola B.R. Keener & Kral, sp. nov. (**Fig. 1**). TYPE: U.S.A. ALABAMA. Blount Co.: along E side of Locust Fork Branch of Black Warrior River, 0-1/4 mi S of Swann Bridge and ca. 1 mi W of Cleveland by Swann Bridge Road, 7 Sep 2002, R. Kral 93190 & B.R. Keener (HOLOTYPE: US; ISOTYPES: F, GA, MO, NCU, NY, TENN, UNA, USCH, VDB, WAT).

Planta inter *S. plumosa* Small et *S. simplex* Kunth et vars et *S. erecta* Pursh, species America borealis orientalis; differt a *S. plumosa* caulibus brevioribus, foliis basalibus brevioribus in ambitibus (ad apicem) latioribus, inflorescentiis angustioribus, acheniis longioribus; differt a *S. simplex* foliis pleurumque latioribus, involucris altioribus, acheniis longioribus et glabris; differt a *S. erecta* capitulis paucioribus, involucris altioribus; floribus disciformibus numerosioribus, corollis disciformibus longioribus.

¹The University of West Alabama, Department of Biological and Environmental Sciences, Livingston, Alabama 35470, U.S.A.

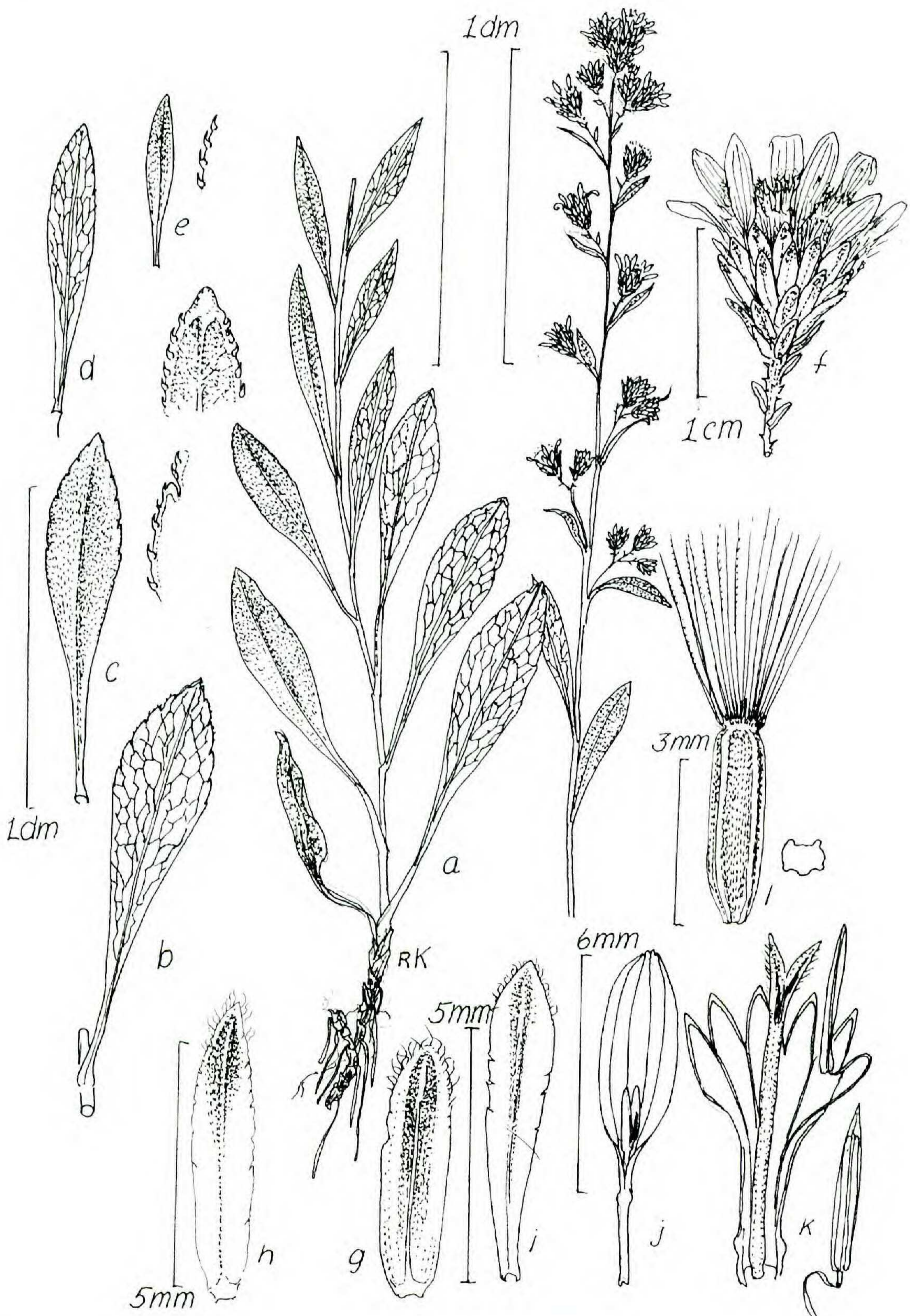


FIG. 1. *Solidago arenicola* B.R. Keener & Kral (from the type). A. Habit. B. Lower cauline leaf, abaxial view. C. Lower cauline leaf, adaxial view. D. Midcauline leaf, abaxial view. E. Uppermost cauline leaf, adaxial view. F. Head and upper portion of peduncle. G. Lower phyllary bract. H. Median phyllary. I. Inner phyllary. J. Ray floret. K. Disc floret post anthesis (left); expended anther.

Perennial (35-)40-80 cm tall from a short, horizontal to ascending rhizome, this and its branches apically caudex-like, to 5 mm thick, mostly imbedded in imbricated chaffy bases of older leaves. Stems erect, single or 2-3 approximate from rhizomal branches, terete, 2-4 mm thick at base, shallowly multicostate, glabrous save in inflorescence and its branches, there sparsely to moderately hirtellous with short (0.2 mm or less), narrowly triangular, spreading or antrorsely curved multicellular hairs. Leaves alternate in high spiral, ascending to erect, margins coarsely scabro-ciliate, with ciliae antrorsely incurved and claw-like, the basal and lowermost leaves mostly spathulate to oblanceolate, 10-15 cm \times 1.5-4 cm, blade below middle entire, gradually attenuate, to a slightly dilated clasping base, distal margins supramedially, coarsely ascending-serrate with long, shallowly convex or level-backed shallow teeth, apices acute to narrowly rounded, often to short, brownish, callused tips; distal cauline leaves gradually narrowing and shortening, ranging progressively to narrowly oblanceolate or narrowly elliptic, with apices more narrowly acute, margins entire, the uppermost 3.5-6 cm \times 6-10 mm, there grading to widely ascending to spreading or even reflexed bracteal leaves; leaf surfaces glabrous, adaxially deep green with only the impressed midvein evident, abaxially pale with midvein raised and with sharply contrasting level network of deep green vein reticulum. Heads arranged into racemose or narrowly paniculate inflorescences, mostly with primary branches widely to narrowly ascending, the lowest usually longest with longer (often reflexed) bracts, from nodes 2-4 cm distant, and most floriferous, progressively shorter, becoming simple or with few-headed cymules, or primary axis simply a raceme of heads. Ultimate penduncles stiffly, widely ascending, angulate, slightly compressed, ca. 0.5 mm thick, stubby-bracteolate, scattered-hirtellous. Heads radiate, essentially turbinate, mature involucre 7-9 mm high, 0.7-1 cm wide at distal most point, phyllaries loosely spirally imbricate, 1-1.3 mm wide with pale, scarious-edged borders, and abaxially sunken midrib, this bordered by a narrow green band dilating apically to a narrow diamond, around a pale, elliptic depression, all with pilose-ciliate apices, lower ones 3-3.5 mm long, transitional from peduncular bracts, more green and shorter than upper, gradually grading to 5-6 mm, narrower, more acute from narrowly elliptic or oblong to linear-oblanceolate with broader, thinner pale borders. Pappus bristles of mature achenes of more or less equal lengths, 4-5 mm long, white, fine and finely barbellate, without evident dilated tips. Ray florets 6-10, carpellate, corolla tube ca. 3 mm long, ca. as long as pappus, blade mostly narrowly elliptic, 3-4 mm long, yellow, stigma branches to ca. 1 mm long, dull brown, mature achenes cylindrical to somewhat elliptic 2-3.5 mm long. Disc florets 11-16, perfect, corolla at anthesis ca. 6 mm, dull yellow, tube ca. 3 mm, throat with 5 divergent, narrowly triangular lobes ca. 2 mm; staminal ring ca. 2.5 mm long; stylar cylinder at anthesis 4-4.5 mm, stigma branches barely divaricate, ca. 1.5 mm. Mature achenes cylindrical to somewhat compressed, 3-4

mm long, typically 5-ribbed, glabrous, abruptly narrowed to a short “neck” surmounted by narrow, brownish pappus disc.

DISCUSSION

Following Nesom’s (1993) taxonomic alignment of *Solidago* L., we find that *S. arenicola* is part of section *Solidago*; however, it is unclear as to which subsection the new species should be placed, it having affinities for species in both *Solidago* and *Albigula* (Raf.) Nesom. Within the subsection *Solidago*, a species complex, loosely referred to as the “Simplex Group,” seems to share similar morphologies with *S. arenicola* (Semple per. com.). The Simplex group is currently thought to be composed of three species which include *S. plumosa* Small, a distinct rarity known only from along the Yadkin River in North Carolina, *S. simplex* Kunth, a more complex and widespread set of morphologies, transcontinental and essentially northern but with one subspecies from the rocky banks of the Potomac River in eastern Virginia [ssp. *randii* (Porter) Ringius var. *racemosa* (Greene) Ringius] and *S. spathulata* DC, which is of dune areas restricted to California and Oregon (Cronquist 1980; Cronquist 1994; Hitchcock & Cronquist 1973). The hypothesized relationship with the Simplex Group and *S. arenicola* is based on a suite of characters that *S. arenicola* shares with these three species, including caudiciform rhizomes, basally disposed, spathulate or oblanceolate, glabrous leaves, racemose or thrysoid-paniculate inflorescences that lack recurved-secund branching, heads turbinate/campanulate with 3–4 seriate phyllaries, ray florets 6–10 per head, and achenes up to 3 mm or more long. Of the subsection *Albigula*, which includes several species found in the southeastern U.S., only *S. erecta* Pursh could be considered close enough to *S. arenicola* morphologically to cause confusion about their identity. The wide-ranging *S. erecta* is known to occur from coastal Massachusetts and New Jersey, west to Indiana and south to northeastern Mississippi, central Alabama, and Georgia. In addition to the characters mentioned above associated with the Simplex Group, which apply here as well, *S. erecta* and *S. arenicola* also sometimes share almost indistinguishable foliage (stem leaves average larger in length and width in *S. erecta*), as well as very similar achene shape. (Cronquist 1980; Small 1933).

Differences that help distinguish the new species from similar species of *Solidago* that are known to occur in the southeastern U.S. are detailed in the key below:

1. Achene surface persistently short-hairy _____ **S. simplex**
1. Achene surface glabrous.
 2. Inflorescence axis and branches glabrous; achenes 2–3 mm long _____ **S. plumosa**
 2. Inflorescence axis and branches pubescent; achenes 3–4 mm long.
 3. Number of heads per stem usually more than 40, involucre 4–6.5 mm high, disc flowers usually 6–10 per head, disc corollas ca. 4 mm long _____ **S. erecta**

3. Number of heads per stem usually less than 30, involucre 7–9.5 mm high, disc flowers usually 12–16 per head, disc corollas ca. 6 mm long _____ **S. arenicola**

ACKNOWLEDGMENTS

We are indebted to John Semple for his continued communication and valuable advice over the course of this project. We are also extremely appreciative of Laurel Hodges who aided in the translation of the English abstract to Spanish. We would like to thank Robert Haynes and Steve Ginzburg who were very supportive and helpful during this project. We would also like to thank Guy Nesom and another anonymous reviewer whose suggestions proved to be extremely helpful in improving the quality of this paper.

REFERENCES

- CRONQUIST, A. 1980. Asteraceae. Vol. 1., Vascular flora of the southeastern United States. University of North Carolina Press, Chapel Hill. [*Solidago*, pp. 116–133]
- CRONQUIST, A. 1994. Intermountain flora vascular plants of the Intermountain West, USA. Volume Five Asterales. The New York Botanical Garden, Bronx. [*Solidago*, pp. 242–250]
- HITCHCOCK C.L. and A. CRONQUIST. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle. [*Solidago*, pp. 549–551]
- NESOM, G.L. 1993. Taxonomic infrastructure of *Solidago* and *Oligoneuron* (Asteraceae: Astereae) and observations on their phylogenetic position. *Phytologia* 75:1–44.
- SMALL, J.K. 1933. Manual of the southeastern flora. Hafner Publishing Company, New York. [*Solidago*, pp. 1344–1360]